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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,053	03/11/2004	Keiichi Kuramoto	MAM-039	4691
20374	7590	02/28/2006	EXAMINER	
KUBOVCIK & KUBOVCIK SUITE 710 900 17TH STREET NW WASHINGTON, DC 20006			CHIEM, DINH D	
			ART UNIT	PAPER NUMBER
			2883	

DATE MAILED: 02/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

7/1

**Office Action Summary**

Application No.

10/797,053

Applicant(s)

KURAMOTO ET AL.

Examiner

Erin D. Chiem

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 December 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 10, 13-16, 21 and 25 is/are pending in the application.
- 4a) Of the above claim(s) 9, 11, 12, 17-20, 22-24 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 13-16, 21 and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/2/04 2/03/05</u> | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This office action is in response to the election filed on December 15 2005. Applicant elected species G, Figures 14-15 (c) drawn to claims 1-8, 10, 13-16, 21, and 25 with out traverse; therefore claims 9, 11-12, 17-20, and 26 are withdrawn from consideration. Claims 1-26, however, are currently pending.

#### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on September 2, 2004 and February 03, 2005 is being considered by the examiner.

#### ***Claim Objections***

Claims 1 and 21 are objected to because of the following informalities: independent claim 1 contains multiple modifiers within a limitation rendering the content between the upper and lower cladding unclear. Since claim 21 is dependent on claim 1, therefore claim 21 is also unclear. Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-6, 10, 13-16, and 25 rejected under 35 U.S.C. 102(b) as being anticipated by Ido et al. (US 6,229,949 B1 “Ido” hereinafter).

Ido discloses an optical waveguide comprising a core layer (3) to be an optical transmission region and an upper clad layer (4) and a lower clad layer covering the surrounding of the core layer (2), wherein the upper clad layer is formed while being shrunk in the volume and a stress moderating layer (5). Regarding the latter limitation of claim 1, the examiner considers the limitation is claiming the product-by-process and thus not considering such limitation with patentable weight. The applicant is invited to provide prove how process provides a product that is not anticipated by Ido’s disclosure. Furthermore, the limitation contains multiple modifiers such that it is unclear what is between the lower and the upper clad layer. Moreover, this limitation is being further limited by claim 21, thus rendering claim 21 to be unclear as well.

Regarding claim 2, Ido discloses the upper clad layer is formed from an organic-inorganic composite (col. 1, lines 40-65).

Regarding claim 5, the stress-moderating layer is formed from an organic-inorganic composite, polyimide siloxane (col. 2, lines 50-60).

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Regarding claim 6, wherein the core layer and/or the lower clad layer is formed from an organic-inorganic composite (col. 5, lines 5-40).

Regarding claim 10, the waveguide is formed on a silicon substrate (Fig. 1).

Regarding claim 13, Ido discloses the stress-moderating layer has a thickness in a range defined as  $0.05 \mu\text{m} \leq t \leq 0.25H$  (Ido's range falls within the limitation  $0.05 \mu\text{m} \leq 1.5 \mu\text{m} \leq 1.75 \mu\text{m}$ ) (col. 6, lines 1-25).

Regarding claims 14-16, the stress moderating layer is formed from the same material as that for the core layer, and the moderating layer is formed integrally with the core layer, thus the stress moderating layer would not have refractive index higher than that of the material for the core layer (Fig. 3).

Regarding claim 25, the rounded corners of the core within the planar waveguide structure is typically caused during etching.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ido in view of Matsuno et al. (JP 2003-248130 A "Matsuno").

Ido discloses an optical waveguide comprising a core layer (3) to be an optical transmission region and an upper clad layer (4) and a lower clad layer covering the surrounding

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of the core layer (2), wherein the upper clad layer is formed while being shrunk in the volume and a stress moderating layer (5).

However, Ido does not disclose the storage modulus of the stress-moderating layer is less than that of the upper clad layer. The examiner respectfully points out that applicant's lexicographic recitation of "the storage modulus" is more commonly known as "Young's modulus" or "bulk modulus" all referring to the stress characteristic of the material within the optical waveguide structure.

Matsuno teaches the Young's modulus of the interface layer is smaller than the Young's modulus of optical waveguide layer and board (See NOVELTY section).

Since Ido and Matsuno are from the same field of endeavor, the purpose disclosed by Matsuno would have been recognized in the pertinent art of Ido.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to recognize the concept of making the interface layer Young's modulus smaller than that of optical waveguide due to thermal expansion coefficient difference of optical waveguide layer and board is suppressed. **The motivation** for providing such interface layer is to fully control the birefringence of the optical structure. The instance layer is very thin thus susceptible to the slightest stress caused by thermal expansion. The slightest stress will cause warping of the layer such that the birefringence is affected.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ido and Matsuno as applied to claim 3 above, and further in view of Gao et al. (US 6,917,749 "Gao" hereinafter).

Ido and Matsuno disclose all the limitations of claim 1 and 3.

However, Ido and Matsuno do not disclose the optimum storage modulus stress range of 100,000 kgf/cm<sup>2</sup> or lower at 30 degree Celsius.

Gao's generalized Equation 1 will satisfy limitation of claim 4 if given the other known variables that applicants does not provide in the claim.

Since Ido, Matsuno and Gao are all from the same field of endeavor, the purpose disclosed by Gao would have been recognized in the pertinent art of Ido and Matsuno.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to recognize Equation 1 disclosed by Gao is a common tool used among designer when the thermal expansion and Young's modulus of a material layer within the waveguide is contemplated. **The motivation** utilizing the mathematical tool as disclosed by Gao is to provide a better design when the stress of the buffer layer has been contemplated rather than performing multiple test trials that would be less efficient and not cost effective. Furthermore, it has been found that "the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ido in view of Ohashi et al. (US Application 2005/0265685 "Ohashi" hereinafter).

Ido discloses an optical waveguide comprising a core layer (3) to be an optical transmission region and an upper clad layer (4) and a lower clad layer covering the surrounding of the core layer (2), wherein the upper clad layer is formed while being shrunk in the volume and a stress moderating layer (5); wherein the upper clad layer is formed from an organic-inorganic composite (col. 1, lines 40-65).

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However, Ido does not disclose the organic-inorganic composite is produced from an organic polymer and a metal alkoxide.

Ohashi discloses a waveguide is made from an organic-inorganic composite is produced from an organic polymer and a metal alkoxide (see paragraph [0239]).

Since Ido and Ohashi are from the same field of endeavor, the purpose disclosed by Ohashi would have been recognized in the pertinent art of Ido.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize an organic polymer and a metal alkoxide as the organic-inorganic composite in the process of manufacturing the optical waveguide since these compounds are known in the art. **The motivation** using organic polymer and metal alkoxide as waveguide composites is to increase durability because such composite resist moisture and heat, thus sustaining the waveguide in a longer operable condition.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin D. Chiem whose telephone number is (571) 272-3102. The examiner can normally be reached on Monday - Thursday 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Erin D Chiem  
Examiner  
Art Unit 2883



Frank G. Font  
Supervisory Primary Examiner  
Technology Center 2800